DOCUMENT RESUME

ED 179 824 CE 023 719

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TITLE	New and Emerging Occupations: A Process for Monitoring and Identifying the Impacts for Vocational and Technical Education.
INSTITUTION	Wisconsin Univ. - Stout, Menomonie. Center for Vocational, Technical and Adult Education.
PUB DATE	Jan 80
NOTE	13p.; Paper presented at the Annual Conference of the American Vocational Association (Anaheim, California, December, 1979)
AVAILABLE FROM	Center for Vocational, Technical and Adult Education, 226 Applied Arts Building, Menomonie, Wisconsin 54751 ($1.00; $0.60 for ten)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	Curriculum Planning; Definitions; *Demand Occupations; Demography; *Educational Needs; *Educational Planning; Employment Opportunities; Labor Market; *Manpower Needs; Needs Assessment; Occupations; Social Change; Social Factors; *Technical Education; Technological Advancement; *Vocational Education
IDENTIFIERS	*Emerging Occupations

ABSTRACT

Pointing out that new and emerging jobs may appear at the local, regional, state, or national level, this paper offers definitions and then goes on to group the changes influencing appearance or emergence of new jobs. The five groups of change factors are (1) technological change, (2) demographic change, (3) legislation, (4) life style changes, and (5) resource changes. It is noted that a combination of factors usually leads to the creation of new jobs and it is largely up to vocational educators (with help from employers) to begin information gathering as early as possible. Educators are urged to continue monitoring trends and the working environment. Follow-up studies of graduates may signal emerging needs, too. The procedure recommended is for the vocational educator to gather, analyze, and interpret data, decide if a program is needed, write a job description, develop and validate a job task list, and then add this input to the regular curriculum development process. The author also discusses low and high risk strategies for infusing new content into the educational process. (CP)

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ED179824

NEW AND EMERGING OCCUPATIONS: A PROCESS FOR MONITORING AND IDENTIFYING THE IMPACTS FOR VOCATIONAL AND TECHNICAL EDUCATION

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January, 1980

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NEW AND EMERGING OCCUPATIONS: A PROCESS FOR MONITORING AND IDENTIFYING THE IMPACTS FOR VOCATIONAL AND TECHNICAL EDUCATION

Introduction.

This article was based on research conducted for vocational education. The examples and narrative will focus on this field. However, readers from other fields or disciplines which draw all or some of their content from current technology should find the process and techniques described in this article relevant.

Technological change is one of the major factors that creates new jobs. Frequently, the other major factors - changes in resources, life styles, demography, and legislation - result from or stimulate new technology. Hence, changes in technology are often associated with new jobs.

With the major challenges this country faces in the areas of energy, environment, inflation and productivity, this decade should be rich in technological developments. This new technology will have to be infused in educational programs at all levels. Congress recognized the importance of keeping pace with technology when it included the development of curriculums related to new and emerging occupations as a part of the 1976 Vocational Education Amendments. Other disciplines that draw upon technology will also need to maintain their relevancy. The process and techniques described in this article provide an approach for monitoring changes and maintaining relevance.

What Are New and Emerging Occupations?

New and emerging occupations may be viewed in several ways. Meleen (1976) defined a new and emerging occupation as

> . . . one which has come into existence in the past two years in skilled and technical areas, for which there is an established demand, a basis for projecting growth, and a shortage of trained labor, and for which no public vocational training is available (p. 3).

This definition may be appropriate for a national research project but is too restrictive for vocational educators at the local level. It would tend to delay response to local training and educational needs. Also, it does not suggest that older occupations emerging in a local area qualify.

The following definitions provide more flexibility and should assist in stimulating the development of more new programs.

- Emerging Occupation. A series of new job activities in the process of evolving into a job. For example, there are several potential areas in the energy field that may emerge into new jobs. And, the rapid increase in the number of micro-computers may stimulate the development of a new technician's job(s) for this field.
- New Occupation. A job for which the work context and tasks are substantially new and have been clearly established during the past two to three years. The level of demand or potential demand for workers and the sophistication of the tasks warrant vocational training. These jobs may be new at the school district, state, regional or national level. Computer programmer was a new occupation in the 1950s and laser technician is one which has evolved recently.

With the above definition, jobs may be new at the local as well as the national levels. Relevance is primarily determined by the match between the skills held by graduates of vocational programs and the jobs open in local business and industry. Therefore, it is critical that vocational educators at the local level continuously monitor the establishment of new jobs in the local labor market.

Factors Influencing New and Emerging Occupations

Changes in five major areas affect new and emerging occupations - (1) technology, (2) demographic, (3) legislation, (4) life styles, and (5) resources. These factors singularly and in combination influence the types of jobs available. Examples of changes in each area are given below.

Technological Changes.

- Fiber optics.
- Lasers.
- Solar energy.
- Semiconductors.
- Microcomputers.
- Information processing.

Demographic Changes.

- Americans are growing older.
- Movement of people to suburbs is slowing.
- More women are working.

Legislation.

- Environmental.
- Energy.
- Health.
- Old occupations emerge as areas of emphasis. (For example, coal technology)

Life Style Changes.

- Fewer children.
- Desire for more input on decisions in the workplace.
- Less respect for authority.
- Desire more meaningful work.
- Great mobility.
- Extensive use of credit.

Resource Changes.

- Energy shortage.
- Amount and quality of trees available for lumber are decreasing.
- Use of resources is doubling every 14 years in the U.S.
- With 5.4% of the world population, the United States uses 40% of its resources.
- Most critical materials will be gone in 100 years or less if we continue present rates of consumption.
- Water shortage.

Usually these factors interact. Changes in the availability and cost of energy will influence life styles, legislation, and technology. These interactions are depicted in Figure 1.

Process for Identifying New And Emerging Occupations

The conditions which give rise to new and emerging occupations used to build up gradually. New scientific developments often took several decades to influence products and services. In the 1960s, this lag was reduced to ten years. Recently, it has been estimated that it takes three to four years to make practical applications of new scientific knowledge. Therefore, it is important to carefully monitor the factors that generate new jobs.

As noted in the previous section, usually there is a combination of factors that lead to the creation of new jobs. These factors and their interactions are depicted in Figure 2. Changes in technology, life styles, resources, demography, and legislation grow and combine until the need created is large enough to command attention and a solution. The products and services developed to meet needs will require people to produce them. If the products and services are unique, new jobs will be generated.

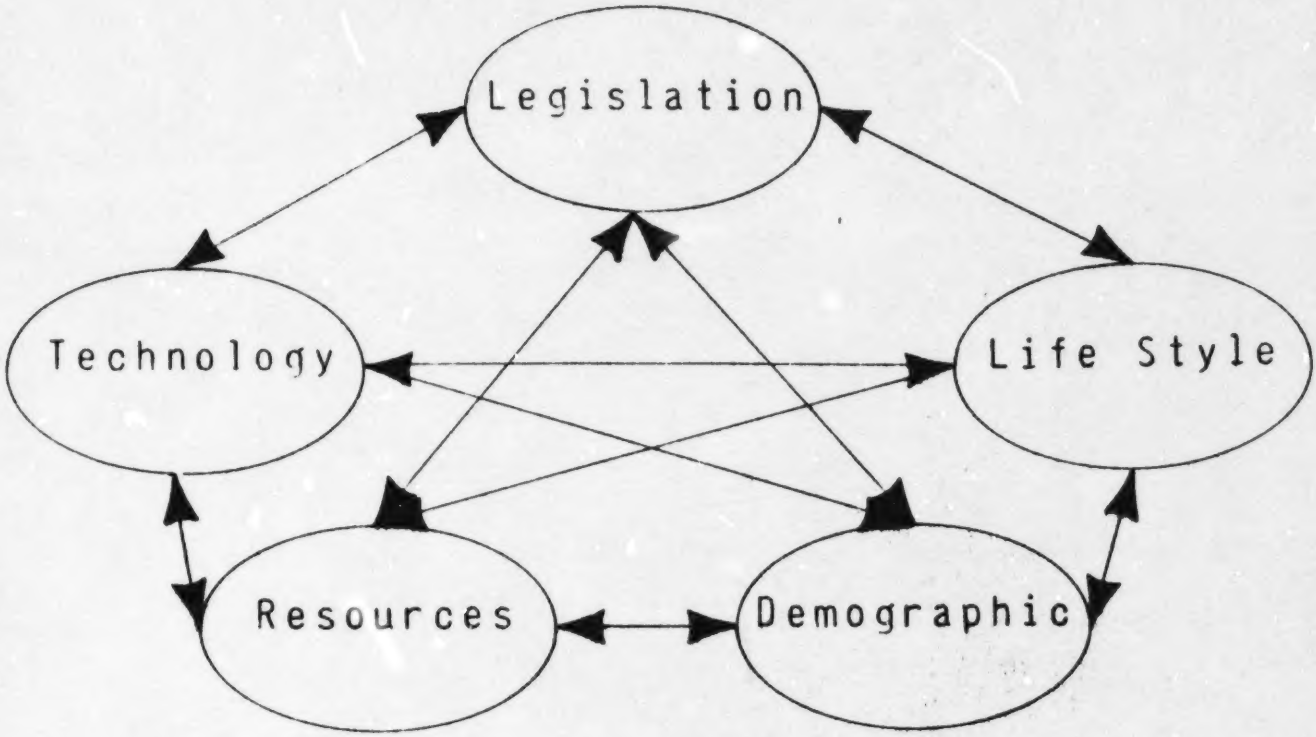

FIGURE 1: RELATIONSHIPS OF FACTORS

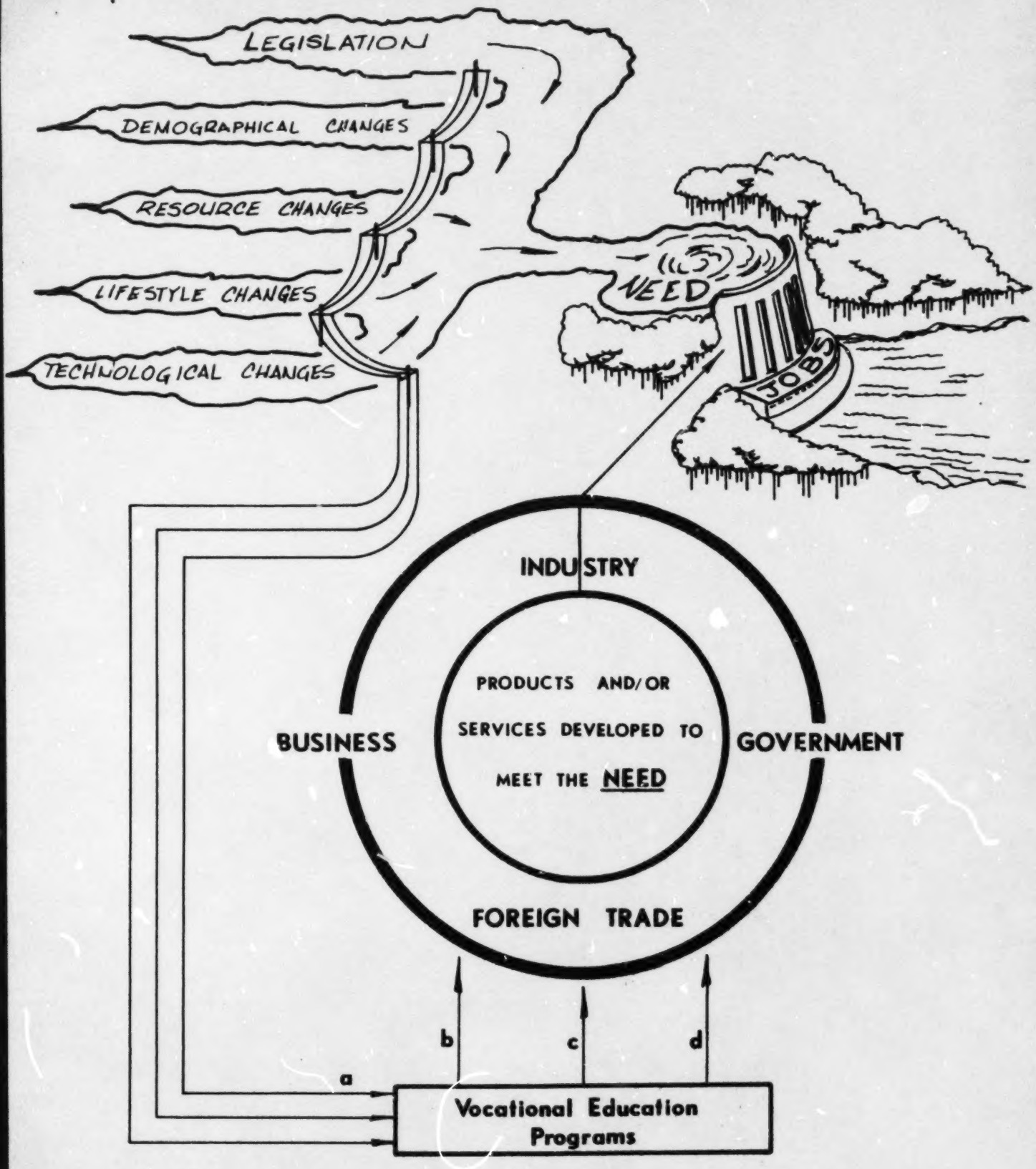
LEGISLATION
DEMOGRAPHICAL CHANGES
RESOURCE CHANGES
LIFESTYLE CHANGES
TECHNOLOGICAL CHANGES
NEED
JOBS
INDUSTRY
PRODUCTS AND/OR
SERVICES DEVELOPED TO
MEET THE NEED
BUSINESS
GOVERNMENT
FOREIGN TRADE
a
b
c
d
Vocational Education
Programs

FIGURE 2.

The usual vocational curriculum development systems will not function until a number of people are performing in the new job. This point in the evolution of a new job is denoted by Line C in Figure 2. If vocational educators are late in isolating the new job, programming may be delayed longer. These lead times in the usual curriculum development systems create the basis for criticisms concerning the relevance of vocational education and the pace at which it offers programs related to new occupations.

The information-gathering process must start earlier in the developmental sequence for a new occupation. Factors that give rise to new occupations must be continuously monitored. Information should be collected as denoted by Point A in Figure 2. Since typical labor market data usually do not include information on new jobs, it will be necessary to use a variety of other sources. These sources are listed in Figure 3. The "X" source has been added to indicate that it may be necessary to obtain other source(s) also.

Vocational coordinators have the responsibility of identifying training needs and facilitating the implementation of programs to meet these needs. They can provide critical data for the monitoring process. They should be alerted to look for trends in technology and the working environment that are just starting to emerge. New products and experimentation with new equipment and materials should be discussed with the teachers in their departments or units.

Valuable data can be provided by advisory committees and follow-up studies. Graduates' responses on a follow-up can identify new areas of competency needed in existing programs. Also, the jobs in which they are employed may generate ideas on new jobs available in areas for which no specific vocational program exists. For example, if a number of graphic arts graduates are being employed in packaging jobs, this may signal the need for a packaging program. Employers can also identify new competency areas for existing vocational programs and new jobs for which they need employees.

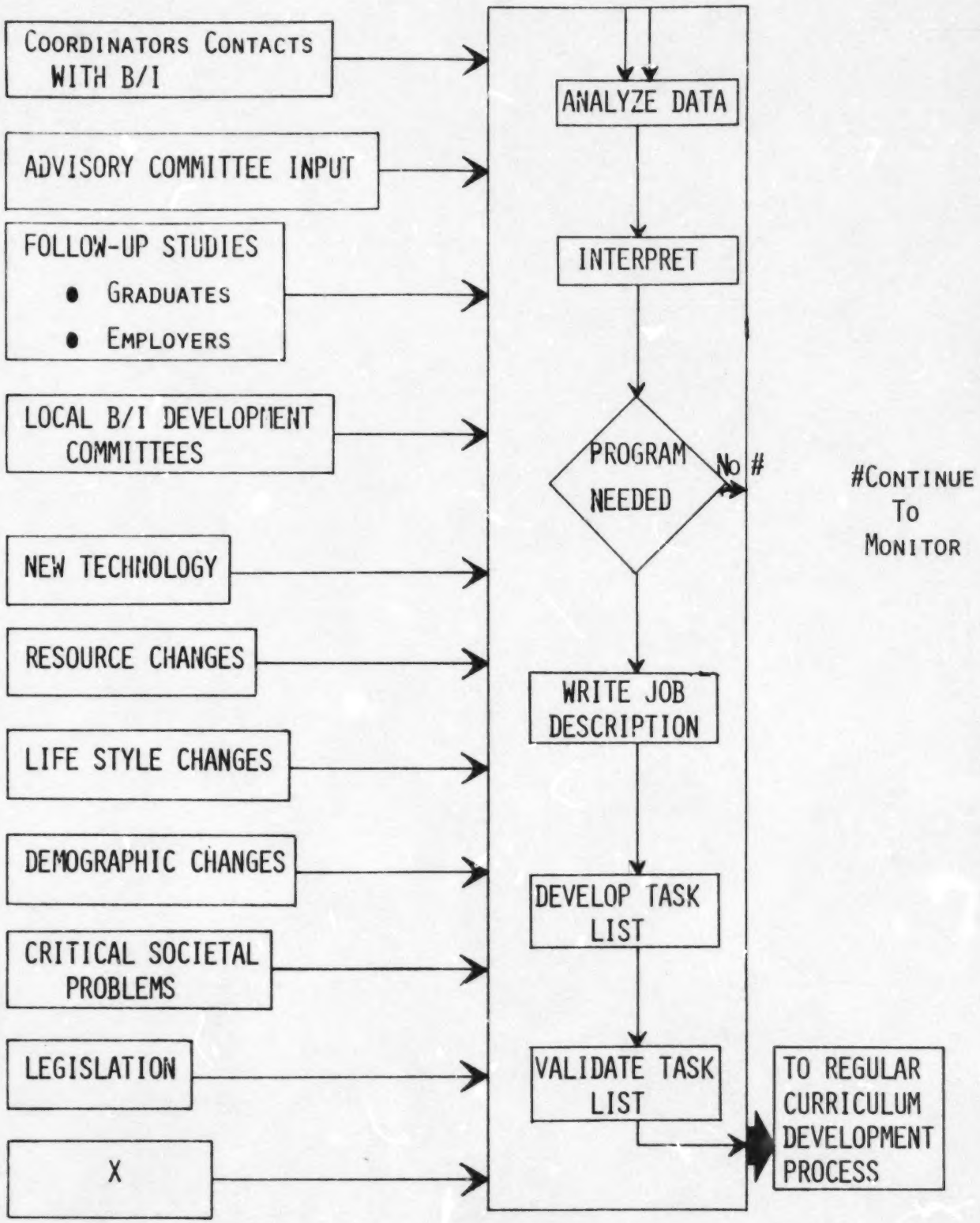

FIGURE 3: COLLECTING AND PROCESSING DATA ON NEW AND EMERGING OCCUPATIONS

Vocational and technical educators should maintain liaison with local business and industry development committees. The work of these committees can create several new jobs in a local community through the establishment of a new business or industry.

All vocational educators in a department should have an assigned responsibility to monitor scientific, technological and resource changes directly related to their fields. In addition, a staff member should be assigned to monitor one or more of the remaining sources of data.

The resulting data should be discussed in departmental meetings on a scheduled basis. Once each six months, the information accumulated should be processed through a future viewing process such as the Delphi Technique or scenarios of future events. This process should be used to identify potential new jobs. A brief job description should be written for each new job.

These descriptions should be used to monitor the local labor market to determine if the number of these jobs is growing and the potential future demand. This information, plus the skill content of the job, can be used to determine if a new vocational program is needed.

If the decision is made that a program is needed, a more detailed job description will need to be written. Next, a list of tasks encompassed in the job should be developed. This list will need to be validated. Since few, if any, persons will be performing this job, it will be necessary to modify the usual task analysis process.* If some employers and employees are familiar

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* If the job is new to the local area but has existed in other parts of the country, there may be a task analysis available. This should be validated with a local advisory committee for the new program.

with all or part of the job, they should evaluate the tasks. In addition, a committee comprised of persons knowledgeable of the technology and possible responsibilities related to the new job should review the task list. They can use the data and job descriptions previously assembled in this validation process.

After the tasks have been validated, the usual curriculum development process can be used. Since the data base for new and emerging occupations is more tenuous, monitoring of the trends in the factors which led to the identification of the new occupation will need to be continued. Also, follow-up evaluation of the initial graduates of the program will need to be more thorough and detailed in order to ascertain if a viable program has been implemented. These evaluation data can be used to make program revisions. In addition, they can be utilized to assess the effectiveness of the procedure used ot identify the new occupation.

A more conservative approach would be to insert one or more new courses in an existing vocational education program. The program selected should be the one most closely related to the emerging or new occupation. Then, as monitoring continues and the nature of the new occupation becomes more distinct, data on the competencies required and placement in the occupation from the modified program can be used to design the new vocational program. This process would be especially appropriate for emerging occupations.

A potential weakness in the process described above is that it may focus on areas presently included in a vocational school or program since most of the data are collected and processed by staff members. The writer's experience has indicated that the information and ideas collected usually go beyond existing program areas. However, it would be appropriate to have a unit or person charged with the responsibility to assemble similar information for occupational areas not included in the vocational program of the school. This information would be processed as described in Figure 3.

A means for studying and making decisions concerning programs which are not directly related to existing departments or units should be developed.

Summary.

In order to detect new and emerging occupations, changes and trends in technology, resources, life styles, demography, and legislation must be continuously monitored. These changes and trends need to be analyzed to determine the implications for new jobs. Techniques used to study the future, such as scenario and Delphi, can be used. Continuous monitoring and analysis of the changes in these five areas will produce a state of mind and approach that will keep vocational and technical educators on the cutting edge of new technology.

References

Melean, Paulette, et al. Identifying and Planning for New and Emerging Occupations: A Suggested Guide. Belmont, Mass: Contract Research Corporation, 1976.